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PROCEEDINGS

OF THE

ROYAL SOCIETY OF EDINBURGH.

1832-33.

No. 1.

December 3.

SIR THOMAS MAKDOUGALL BRISBANE, K. C. B.

President, in the Chair.

The following Donations were presented :—

Transactions of the Society of Arts, Manufactures and Commerce,
Vol. XLVIII.—*From the Society.*

Examen relatif aux Projets de Barrage de la Seine dans le Voisi-
nage du Havre : par M. le Baron du Prony.—*From the Author.*

Formule et Table pour calculer l'effet d'une machine à vapeur :
par M. le Baron du Prony.—*From the Author.*

Memoirs of the Literary and Philosophical Society of Manchester.
Vol. V. New Series.—*From the Society.*

Memorie della Reale Accademia delle Scienze di Torino. Vol.
XXXV.—*From the Academy.*

Transactions of the American Philosophical Society. Vol. IV.
New Series. Parts I. and II.—*From the Society.*

Annual Report of the Council of the Yorkshire Philosophical
Society for 1831.—*From the Society.*

Philosophical Transactions of the Royal Society of London for
1832. Part I.—*From the Society.*

Flora Batava. No. 90. and 91.—*From the King of Holland.*

Arsberattelser om Vetenskapernas Främsteg, &c. D. 31 Mars
1829, and 31 Mars 1830. 2 vols.

Kongl. Vetenskaps Academiens Handlingar för Ar. 1829 and
1830. 2 vols.—*From the Academy.*

- Transactions of the Cambridge Philosophical Society. Vol. IV.
Part II.—*From the Society.*
- On the Osteological Symmetry of the Camel. By Walter Adam,
M. D.—*From the Author.*
- Transactions of the Geological Society of London. (Second Series.)
Vol. III. Parts I. and II.—*From the Society.*
- Nouvelle Maniere de Defense, avec des Habits d'Amiante à l'usage
des Pompiers dans les cas d'Incendies. Par A. Vanossi.—*From
the Author.*
- The Sixth to the Fourteenth Annual Reports of the Devon and
Exeter Saving Banks.—*From Sir Robert Abercromby.*
- Abhandlungen der Königlichen Akademie der Wissenschaften zu
Berlin, 1828 and 1829.—*From the Academy.*
- Untersuchung uber die gegenseitigen Störungen des Jupiters und
Saturns. Von P. A. Hansen.—*From the Author.*
- Physiologie Vegetale. Par M. A. P. De Candolle. 3 Tomes.—
From the Author.
- Mecanique Celeste. By the Marquis De la Place. Translated,
with a Commentary, by Nathaniel Bowditch, LL. D., &c.
Vol. II.—*From the Translator.*
- Mémoires de la Societé de Physique et d'Histoire Naturelle del
Geneve. Tome V.—*From the Society.*
- Memoir of the Pearly Nautilus, with Illustrations of its External
Form, and Internal Structure. By Richard Owen, Esq.—
From the Royal College of Surgeons, London.
- Mémoires de l'Academie Royale des Sciences de l'Institut de
France. Tome II.—*From the Academy.*
- Palæologica zur Geschichte der Erde und ihrer Geschöpfe von
Herman von Meyer.—*From the Author.*
- Essay on the Natural History of Thermal and Mineral Springs.
By Meredith Gairdner, M. D.—*From the Author.*
- Inquiries concerning the Intellectual Powers, and the Investiga-
tion of Truth. By John Abercrombie, M. D. F. R. S. E. &c.—
From the Author.
- Materia Hieroglyphica. By J. G. Wilkinson, Esq. Three Parts,
and Plates.—*From the Author.*
- Comparative Account of the Population of Great Britain, in the
years 1801, 1811, 1821, and 1831. By J. Rickman, Esq.—
From the Author.

On the Moral and Physical Condition of the Working Classes in Manchester. By Dr Kay.—*From the Author.*

Nouveaux Mémoires de l'Académie Royale des Sciences et Belles Lettres de Bruxelles. Tomes V. and VI.—*From the Academy.*

Mémoires Couronnés en 1829 et 1830, par l'Académie Royale des Sciences et Belles Lettres de Bruxelles. Tome VIII.—*From the Academy.*

Astronomische Beobachtungen auf der Königlichen Universitäts Sternwarte in Königsberg. Von F. W. Bessel. Funfzehnte Abtheilung.—*From the Author.*

Two Specimens of the *Draco Lineatus*, from Ava.—*From Mrs R. Cockburn.*

Twenty-nine Specimens of British Fishes.—*Presented by J. F. W. Johnston, Esq. F. R. S. E.*

The following communications were then read :—

1. On the Colours of Natural Bodies. By Sir David Brewster, V. P. R. S. Ed.

The only Theory of the Colours of Natural Bodies that has met with reception in modern times, is that of Sir Isaac Newton, who considers them as identical with those of thin plates, and as varying with the size of the ultimate particles of the body.

Although this theory, ingenious as it is, be liable to many great objections, and be not capable of explaining the phenomena, even if its postulates be admitted ; yet the author of the present paper does not assail it with any arguments of this kind. He has, on the contrary, attacked it in its stronghold, and has endeavoured to bring it to the test of direct experiment.

Sir Isaac Newton considers the green colour of plants (the most general colour which nature presents to us) as a *green* of the *third* order of periodical colours, and has also given us the exact composition of this particular colour.

In order to determine the composition of the green colour of plants, the author dissolved their colouring matter in alcohol ; and having analyzed it by a fine prism, he found it to have, in every case, the same composition. The portions of the spectrum, however, which entered into its compound tint, were totally different from its theoretical composition, as assigned by Sir Isaac Newton ; and had no relation whatever to the colour of their plates. The

green colouring matter exercised an arbitrary specific action upon different parts of the spectrum, and its green colour was owing to its having absorbed a certain number of rays, which, when subtracted from the white light, left the colour under consideration.

In order to render this result more general, the author examined an immense number of coloured solutions, obtained from plants and artificial salts, and a great variety of coloured solids, either formed by art, or obtained in nature; and in all these cases, he found no indication whatever of periodical colours. The colours were invariably produced by the absorption of certain definite rays taken arbitrarily and unequally from different parts of the spectrum; and, excepting in the case of certain imperfectly transparent and opalescent fluids, there never was the slightest trace of a reflected tint similar to that which might have been expected, had the Newtonian theory been true.

2. Notice respecting the Determination of the Geographical Positions of the Village of Chamouni, and of the Convent of the Grand St. Bernard. By James D. Forbes, Esq., F.R.SS.L. & Ed.

The author undertook the determinations of these positions at the suggestion of Professor Gautier of Geneva, who informed him, that they had not been fixed by any direct observations. The great discrepancies of the best maps of the Alps in laying them down, confirm this opinion; and the author has quoted the latitudes and longitudes, given by the best authorities, at the end of his paper.

The new determinations give for the positions,—

	Latitude.			Long. E. of Geneva.		
Chamouni,	45°	55'	54"	. . .	27 ^m	25 ^s
St. Bernard,	45°	50'	16"	. . .	28 ^m	19 ^s

The latitudes were determined by successive altitudes of the pole star, taken with an altitude and azimuth circle, upon Captain Kater's construction, the circles being $4\frac{1}{2}$ inches in diameter, and divided to 15". The position of St. Bernard is the best determined, eight altitudes of the pole star having been taken, the results of seven of which agree closely.

The longitudes were determined chronometrically, in the *first* place, by comparisons with the Geneva Observatory clock, and in

the *second*, by the time at the two places, calculated from altitudes of the sun taken with the instrument just mentioned. Though the rate of the chronometer was wonderfully steady, considering the shocks to which it was exposed, the author does not conceive that the longitudes are determined with very great precision.

December 17.

PROFESSOR RUSSELL, Vice-President, in the Chair.

The following Donations were presented :—

Philosophical Transactions of the Royal Society of London for 1832. Part II.—*From the Society.*

Contribution to a Natural and Economical History of the Coco-Nut Tree. By Henry Marshall, Deputy-Inspector of Army Hospitals.—*From the Author.*

Astronomische Nachrichten. Nos. 221-232 inclusive.—*From Mr Bessel.*

The time usually employed in the ordinary business of the Society having been occupied by a discussion on extraordinary affairs, the reading of the communications announced for this meeting was deferred.

January 7.

SIR THOMAS MAKDOUGALL BRISBANE,

President, in the Chair.

The following Donations were presented :—

The Entomological Magazine. No. 1.—*From James Wilson, Esq. F. R. S. E.*

Historical View of the Progress of Discovery on the more Northern Coasts of America. By P. F. Tytler, Esq. and James Wilson, Esq.—*From the Authors.*

The following communications were then read :

1. Researches on the Conducting Power of the Metals for Heat and Electricity, tending to establish a New Analogy between these principles. By James D. Forbes, Esq. F.R.SS.L. and Ed.

The paper began by pointing out the very limited class of bodies

to which observations of the kind alluded to have been extended. The author was led to a careful examination of the existing determinations of the conducting powers of the metals for heat, by some collateral trains of experiment in which he was occupied two years ago. He points out the degree of confidence which may be placed in the *arrangement* of conductors given by different authors; for we appear to be far from reaching a correct estimate of their numerical values. In viewing those of M. Despretz as the best, he remarks, that the position of platinum, which is certainly erroneous, shews how imperfectly we can depend upon experiments on this point, made with even more than usual care. Platinum is placed, by this writer, almost at the top of the list, between gold and silver, whilst the commonest experiments serve to shew that it is really a very imperfect conductor.

In order to verify the conclusions of previous observers, and to determine the position of some metals upon which no experiments seem to have been made, the author employed Fourier's Thermometer of Contact, an elegant instrument, which he believes has not before been practically applied. His experiments, however, being only intended for the illustration of a subject of collateral inquiry, were not made with the detail that they would otherwise have been, nor are they presumed to be perfectly accurate. They served, however, to confirm previous experiments on the order of the metals, as conducting substances; to restore platinum to its right place, and to fix the positions of antimony and bismuth. From these and other data he considers the following as the most probable arrangement of conductors of heat, beginning with the best:—*Gold, Silver, Copper, Brass, Iron, Zinc, Platinum, Tin, Lead, Antimony, and Bismuth.*

In like manner, by a careful comparison of the results of Harris, Becquerel, and Pouillet, including some experiments on antimony and bismuth, made at the author's request by Mr Harris, he concludes, that the arrangement of the metals, as conductors of electricity, is the following, which he observes is probably better established than the corresponding one for heat:—*Silver, Copper, Gold, Zinc, Brass, Iron, Platinum, Tin, Lead, Antimony, and Bismuth.* He observes, that the deviations from a common arrangement only occur, where it is agreed by experiments on both points, that the metals are extremely closely allied; as, for exam-

ple, Gold and Silver, Iron and Platinum. His general conclusion is this ; *That the arrangement of conductors of heat does not differ more from that of conductors of electricity, than either arrangement does alone under the hands of different observers.*

2. The reading of a paper by Robert Knox, M. D. F. R. S. E., on the Natural History of the Salmon, was commenced.

January 21.

DR HOPE, Vice-President, in the Chair.

The following Donation was presented :—

Tableau du Terrain du Departement du Calvados. Par M. Herault, Ingenieur en Chef du Corps Royal des Mines.—*From the Society of Antiquaries.*

The following communications were then read :—

1. On the Super-Sulphuretted Lead of Dufton. By J. F. W. Johnston, Esq. A. M. F. R. S. E.

The object of the author of this paper, was to shew that the mineral alluded to is not a new atomic compound, but that it consists merely of common sulphate of lead, with a portion of pure sulphur, varying from 6 to 10 per cent.

2. The reading of Dr Knox's paper on the Natural History of the Salmon, was concluded.

The object of the author was a careful examination of facts in the Natural History of the Salmon, which hitherto have been taken merely upon opinion. He watched and carefully observed personally the deposition of the ova or eggs of the salmon under the gravel,—its long confinement in that situation,—its growth into a fish about an inch in length,—its ascent through the gravel, and rapid growth whilst in the rivers : the journals of observation were partly read to the Society. Twenty weeks was the period from the time of deposition to their bursting the outer shell ; for nine days longer they continued under the gravel as fishes, drawing their nourishment from the yoke of the

egg, which is of course attached to them by the umbilical vessels or more properly, by the ompholo-mesenteric vessels. During this period, they do not eat or grow much, but without doubt acquire strength. When the yoke on which they have been feeding becomes nearly exhausted, they rise from their sandy and gravelly bed, making their way to the surface, through a thickness varying from one to two feet, and at last gain their new habitat in the waters. In ten days they may be caught in the rivers, very considerably grown, and in twenty days have attained a length varying from six to nine inches.

An extensive personal inquiry shewed that they are never the prey of trout; and a more limited one renders it doubtful if they *ever* become the prey of kelt, or spawned salmon, on its return to the ocean. It is probably to avoid the effects of severe frosts, that the salmon selects the bed of the running stream as the spot for the favourable deposition of the ova. The beds of rivers, he conjectures, must vary somewhat in temperature; and the author supposes, that extreme frosts are less likely to reach the gravel under the stream than under the pool. Frequent experiment has convinced the author, that the opinions of Sir Humphry Davy, Jacobi and others,—opinions which maintain that the gravel below the stream is selected by the salmon, on the ground of the better aëration of the ova, have no real foundation whatever.

The food of the fry has been determined precisely, and their whole habits, by repeated anatomical examinations made by himself.

The salmon seems to hybernate somewhat in certain seasons; a great number of salmon and trout do not enter into the spawning condition, and consequently may be got in first rate order as food, at any time, provided they have the means of subsistence: now, this the salmon can always get at in the ocean, which is his true feeding ground. He cannot get food in rivers of the kind he desires. The salmon-trout, on the contrary, even at the mouths of rivers, will take to the fry of other fishes, to small fishes, and to worms; and in rivers, he will feed on the larvæ of insects, insects themselves, and, in short, on the ordinary food of trout.

The true salmon prefers a peculiar kind of food, the ova of the echino-dermata, and takes, with great reluctance, any other. Hence, the moment he enters rivers, having abandoned his

natural feeding ground, he deteriorates constantly, refuses all kind of food, loses weight and flavour, and gets, in short, entirely out of order. Nor can he ever recover from this state, till he has revisited the feeding-ground in the ocean. It is easy to perceive in these few statements, how entirely they alter the whole question of the salmon-fisheries.

These inquiries led the author to examine into the history of the herling. They resemble in their habits the salmon-trout, haunting the feeding-ground of the salmon; and when fed on the peculiar food of the salmon, their flavour is excellent; but they take readily to coarser food, as small herrings, fry, sand-eels, and the fry of any other fishes. Their stomach and intestines get loaded with putrescent debris, their flesh loses its flavour, and their condition, as articles of human food, has changed materially. No two conditions can be supposed more opposite than the herling presents, when fed on salmon food, and when fed on fishes. They differ, therefore, from salmon-trout in this respect; that, when feeding on the food of the salmon, they attain almost the flavour of the salmon, which the salmon-trout never does.

The author discovered and exhibited the food of the Vendace of Lochmaben, which had never been seen before by any one; explained the reasons why this fish could not be taken with bait; proved the vendace to be male and female, and offers suggestions for the stocking of the various lakes in Britain with this exquisite fish, pointing out first the necessity of locating its natural food, without which, it cannot live. The discovery of these circumstances, with regard to the vendace, led the author immediately to think of the herring, whose food and natural history generally he believed to be unknown.

It was ascertained that the herring resembles the vendace in its habits, as to food more particularly; and that whilst feeding on the incredibly minute entomostraceous animals, which it more especially affects, the condition of the herring is excellent, rendering it an extremely desirable food for man. In this state, the stomach seems as if almost altogether empty (as in the vendace), though at the moment full of minute animals, to be discovered only with the microscope, and on which the animal has been feeding. The intestines also seem as if empty; the tunics of the whole digestive canal are fine and semi-transparent, and as free of

intestinal and putrescent debris found in the stomach and intestines of animals, as if the herring actually fed on nothing but air and water. When he approaches the shores, thus quitting the proper feeding-ground, he takes to other and coarser food ; his condition alters, and his flesh becomes soft and tasteless. The stomach and intestines are found loaded with putrescent remains, and gutted or ungutted, this fish could never be brought into the market as equal to the product of the Dutch fisheries.

February 4.

SIR THOMAS MAKDOUGALL BRISBANE,
President, in the Chair.

The following Donations were presented :—

The Present State and Future Prospects of Mathematical and Physical Science in the University of Oxford. By the Rev. Baden Powell, Savilian Professor of Geometry.—*From James D. Forbes, Esq.*

Transactions of the Cambridge Philosophical Society. Vol. IV. Part III.—*From the Society.*

Charter and Bye-Laws of the Cambridge Philosophical Society.—*From the Society.*

The following communication was read :—

Account of some Optical Phenomena observed upon the Rigi, on the 16th October 1832. By James D. Forbes, Esq., F. R. SS. L. and Ed.

The object of this paper, was to describe an example of a class of phenomena, which is imperfectly understood. The author observed an indistinct mass of reflected light, surrounded by a faint glory, on the surface of a stratum of thick white clouds, 1000 or 1200 feet below him, when descending from the Rigi. The centre of the coloured circle was the point diametrically opposite to the sun, and consequently varied with the position of the observer. As he approached the level of the cloudy ocean, the colours became brighter, and the circle more distinctly formed, and the shadows of the author and his companion were thrown with distinct outlines

upon the illuminated surface. The diameter of the red ring of the corona was about 18° , and he ascertained, by experiment, that the distance of the plane on which it was formed, was only 70 feet. The red occupied the interior of the prismatic circle. When completely immersed in the cloud, the shadow of the observer assumed a new appearance, owing to the want of a definite illuminated surface upon which it could be thrown; and the continuation of the shadow towards the interior of the cloud, presented the aspect of shadows when a sun-beam is admitted into an atmospheric space filled with light dust; and, by the effect of perspective gave an appearance of a true convergence of rays, such as is occasionally observed on a great scale opposite to the sun.

The author pointed out that the theory of the coloured rings suggested by Mr Fraunhofer is untenable. It supposes the inflexion of rays, by watery particles round the head of the observer, whilst experience shews, that these effects are produced, when the observer stands in a perfectly pure atmosphere, and even at the distance of 1000 feet from the cloud. The theory of Dr Young was also noticed, which presumes a quadruple reflection in the interior of the aqueous drops; an opinion which, perhaps, it may be difficult to reconcile with the great brilliancy of the colours displayed.

February 18.

DR HOPE, Vice-President, in the Chair.

The following Donations were presented:—

Transactions of the Society for the Encouragement of Arts, Manufactures, and Commerce. Vol. XLIX. Part I.—*From the Society.*

Flora Batava. No. 92.—*From His Majesty the King of the Netherlands.*

The Annual Reports of the Leeds Philosophical and Literary Society for 1828, 1829, 1830, and 1831.—*From the Society.*

The following communications were then read:—

1. Notice respecting the Application of Heated Air to Blast Furnaces. By Robert Bald, Esq. F. R. S. E. (To be continued.)

2. An attempt to illustrate the remaining monuments of the Ancient Etruscan Language. By the Rev. John Williams, A. M. F. R. S. Ed.

The principal object of this paper, was to defend some interpretations of words in the ancient language of Etruria, proposed by Lanzi, and attacked by Niebuhr; as well as to point out some new analogies with other dialects. The languages which the author proposes particularly to call to his assistance are, Greek, Latin, Anglo-Saxon, and Cambrian or Welsh. The paper concluded with an application of these aids to a variety of words in the Etruscan language.

March 4.

SIR THOMAS MAKDOUGALL BRISBANE,
President, in the Chair.

The following Donations were presented:—

A Brief Inquiry into the State and Prospects of India.—*From William Blackwood, Esq. Bookseller.*

Essays by the late Robert Hamilton, LL. D., Professor of Mathematics in the Marischal College, and University of Aberdeen.—*From Alexander Thomson, Esq. of Banchory.*

Principes de Philosophie Zoologique. Par M. Geoffroy Saint-Hilaire.—*From the Author.*

Tableau de l'Hyoide dans les Quatre Classes des Animaux Vertébrés. Par M. Geoffroy Saint-Hilaire.—*From the Author.*

The following communication was read:—

On the Gradual Elevation of Land in High Northern Latitudes. By J. F. W. Johnston, Esq. F. R. S. Ed.

In this paper, the author shewed, by a number of phenomena observable within the coasts of Sweden, chiefly around Stockholm, and on the shores of the Lake Macler and its arms, that the conclusion of the Swedish surveyors in 1821, that a change of the relative level of the land and water along the coasts of the Baltic had in many localities taken place, could not reasonably be disputed.

He then considered if it were possible that the level of the Baltic could have fallen, being, by its connection with the North Sea, a branch of the great ocean ; and concluded, from the permanency of the respective level of the land and water on the coasts of Pomerania, among the Danish islands, and at some points on the shores of Finland, that the level of the Baltic Sea had undergone no change of level for the last six hundred years. The change observable on the coasts of Sweden, therefore, must be due to an elevation of the land, now gradually, though insensibly, in progress. This rising is estimated to proceed at present at the rate of about one foot in twenty-five years.

The absence of any record of violent volcanic action in the Scandinavian Peninsula, renders it improbable that the rise is due to such a cause. The author referred it, therefore, to the gradual cooling of the crust of the earth, which, by causing a contraction and compression in parts where the cooling was a maximum tending to elevate other portions of the earth's surface at points or in lines of minimum resistance.

The centre of the action in Scandinavia, he considered to be in the mountain chains which traverse Norway, and Sweden, and Finland respectively ; and which are mutually connected beyond the head of the Bothnian Gulf : and attributing the original elevation of these chains with Elie de Beaumont, to the secular refrigeration of the earth, he found in the rise still observable in Scandinavia a relic only of that once powerful action by which these mountain ranges were originally projected. He suggested the probability also, that on other coasts where high mountain ridges ran parallel with the sea, accurate measurements of the mean level of the water, in reference to the scarped rocks on the coast, if repeated at certain distant intervals, might make known other gradual elevations still in progress, similar to those observable on the shores of the Baltic.

March 18.

PROFESSOR RUSSELL, Vice-President, in the Chair.

The following Donations were presented :

Exposition Elementaire des Principes qui servent de Base à la
Theorie de la Chaleur Rayonnante. Par Pierre Prevost,

F. R. SS. L. and E., Professeur Emerite de Physique et de Philosophie, à l'Academie de Genève.—*From the Author.*

A Variety of Specimens of Minerals from the Coast and Interior of Ceylon.—*From Dr Sibbald.*

The following communications were laid before the Society :

1. Observations on the Anatomy of the Rorqual (a Whalebone Whale of the largest magnitude), drawn up from the dissection of a specimen found dead off North Berwick. By Robert Knox, M. D., F. R. S. Ed.

This paper, composed chiefly of anatomical details regarding the anatomical structure of the Rorqual, scarcely admits of abridgement. The author has described the skeleton of the cavity for receiving the brain and the mechanism of the larynx at greatest length. The entire length of the whale, measured by a straight line, drawn on the sand from the nose to the middle part of the tail, and making a slight allowance for the curved position in which the animal lay, was 80 feet. Length of the head 23 feet. The girth of the carcass at the pectoral extremities (though the animal had been ten days on the beach, and was much collapsed) 34 feet. Breadth of the tail from tip to tip 20 feet. The author describes the appearance of the mouth, lined with whalebone, as very surprising. The whole surface of the palatal plates of the superior maxillary bones, each extending to 14 feet in length, was covered with a mass of what appeared to be well teased baked hair, of a clear and shining black. This was the whalebone, arranged in the most regular manner, and composed of many thousand plates; the number as seen in profile, and which are the largest plates, amounted to upwards of 650. It weighed nearly two tons while soft. The whole skeleton weighed nearly thirty-two tons, and was removed to Edinburgh with much difficulty. The weight of the brain, calculated by Sir William Hamilton's method, from the capacity of the cranium, must have been about fifty-four lbs.

The larynx is quite simple, and totally unlike that of the Dolphin and Porpoise. The nostrils are filled by two enormous cartilaginous masses acted on by muscles occupying the centre of the superior maxillary bones. When the animal breathes, they are withdrawn sideways to admit of the passage of air. This extra-

ordinary structure the author considers as unique, and that it had not fallen previously under the notice of any scientific observer.

2. Dr Knox verbally communicated some new observations on the structure of the Foot of the Horse. He demonstrated the navicular bone of the horse's foot not to be a sesamoid bone, nor a peculiar structure formed expressly for the horse, but the *Epiphysis* of the *Os pedis* or coffin-bone. This was proved satisfactorily by a direct appeal to structure. Besides anticipating results of practical consequence from this discovery, the author is led to observe, that an organ may be displaced and employed to perform different functions in different animals,—that the epiphyses of bones are intended by nature to form separate bones in a vast variety of animals,—and that they may often lead to the discovery of the type of the skeleton in fossil remains of extinct animals.

3. The reading of a paper was commenced, entitled, Experimental Researches regarding certain Vibrations which take place between Metallic Masses having different Temperatures. By James D. Forbes, Esq. Professor of Natural Philosophy in the University of Edinburgh.